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ABSTRACT

A study using a biasing paradigm examined four hypotheses regarding specific mechanisms thought to underlie the Assimilation-plus-Correction (A-C) theory of schema-text interactions. According to this theory, the ideas implied by a schema (type-1 ideas) are thought to be assimilated and obscured, while those ideas representing novel information (type-2 ideas) and having potential to extend and modify the reader's "cognitive attitude" achieve dominance in the encoded representation of text. The subjects were 60 college students who read two texts either without biasing information (the control condition) or with introductory paragraphs and complementary details throughout the text that reflected a masculine-feminine or conservative-liberal bias (the experimental condition). Subjects completed posttests immediately after reading the texts and again one week later. The findings favored the "Change of State of Schema Hypothesis," which assumes that type-2 text encounters exert accommodative change on the schematic memory representation of text, causing a perspective shift that increases the reader's capacity to regenerate text ideas consistent with an evolved state of schema, but decreases ability to recall ideas compatible with the original, nonevolved state. Consistent with a previous study, the perspective shift was associated with information loss and with subjects low in verbal ability. (RL)

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ABILITY RELATED DIFFERENCES IN SCHEMA-GUIDED TEXT PROCESSING

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INTRODUCTION

Background: Review of Study I

A study reported at the 1981 annual meeting (Derry, Note 1) addressed the question of how information acquired through reading blends with and changes activated knowledge systems already present in memory. Three schema-based processing models were tested. One was the Assimilation Hypothesis, which assumes that pre-reading schemata absorb incoming data, producing a conceptualized memory representation containing few specific details. A second was the Schema+Correction Hypothesis, which views the schema as a scaffold that selectively anchors subordinate text ideas. A third was Assimilation+Correction theory, which draws a distinction between ideas that are implied by the schema (type 1), and those which represent novel information having potential to extend and modify the reader's "cognitive attitude" (type 2). Predicated (implied) information is thought to be assimilated and obscured, while new ideas achieve dominance in the encoded representation of text.

To test these hypotheses, the learning pattern for a treatment group which read a text on Greek mythology preceded by an advance organizer was compared to that of a control group which read the same text without schema-clarification. The assimilation+correction view was supported. Also, an aptitude x treatment interaction analysis demonstrated that with schema-based processing, poor reasoners lose a significant amount of detail associated with type 1 information, while high ability learners encode more type 2 data without concommitant loss of "familiar" detail.

Study II: Hypotheses and Predictions

The Assimilation+Correction Hypothesis assumes, in essence, that a subject's pre-reading schema roughly dichotomizes the forthcoming text according to a type 1 (relatively predictable ideas)/type 2 (relatively unpredictable ideas) classification. In Study I, type 1 ideas appeared to be obscured and generalized in the final encoded text representation, while type 2 ideas were enhanced. The present study was conducted to explore alternative explanations of specific mechanisms hypothesized to underlie this assimilation+correction effect.

The False Sense of Security Hypothesis (FSSH) provided one possible explanation for the type 1 memory deficit. According to this view, when a type 1 detail is encountered during reading, the subject is duped by a false sense of security that the seemingly apparent data can later be regenerated from available knowledge, and consequently allots little processing time to its acquisition (Spiro, 1980, p. 267). A second possibility was the Discrepancy Principle Hypothesis (DPH), the notion that unpredictable ideas seem novel and surprising, and consequently attract more attention and processing time. The Change in State of Schema Hypothesis (CSSH), which emphasizes the reconstructive nature of recall, assumes that type 2 text encounters exert accommodative change forces on the learning schema, increasing its power to reconstruct information consistent with the evolved state of mind, but decreasing its regenerative power for ideas most compatible with the initial, but not the final state. A fourth possibility was the Structural Importance Hypothesis (SIH), the notion that ideas are remembered better when the schema increases the learner's perception of their importance to the text as a whole (Pitchert & Anderson, 1977).

Structural importance is a known correlate of memory (Johnson, 1970) and was employed in this study primarily as a covariate.

The schema-control method used was attitude biasing with a social stereotype. A control group and two experimental groups read the same two stories. One experimental group received introductory paragraphs and titles designed to invoke images and ideas associated with common social stereotypes, such as feminity, and to cause learning of the stories from those perspectives (e.g., your first story is about a school for young ladies). The second experimental group received introductory information invoking schemata based on contrasting stereotypes (e.g., your first story is about a school for boys). The control group received no biasing information. Biasing treatments, compared to the advance organizer of Study I, were designed to influence the predictability of target ideas contained in the texts.

In one phase of the study, subjects in the three treatment conditions read the stories and rated the predictability of each target idea, either without knowing what target ideas actually appeared in the passages (prediction ratings), or after having encountered each target in its passage context (postdiction ratings). In a second norming experiment employing the same treatments and design, Ss read the passages and rated the structural importance of each target idea. In the main procedure, a memory experiment, a third group receiving the same experimental treatments first read the stories and later recalled the target events. Recall scores for target ideas, obtained from the memory experiment, were systematically regressed on vectors containing treatment codes and continuous predictors derived from the pre-postdiction and structural importance norming proce-

dures. Each vector entered into a regression equation represented an apriori theoretical prediction based on one of the four hypotheses previously discussed.

For example, one prediction was based on DPH, which posits a negative relationship between target predictability and mean target recall. The alternative finding, that information consistent with prior knowledge is recalled with greater accuracy than is novel or discrepant detail, would support proactive facilitation models positing selection of text ideas consistent with prior experience (e.g., Anderson, Spiro & Anderson, 1978). Entry of a quadratic term into the regression equation also permitted investigation of a special version of DPH, namely that story ideas representing moderate deviation from expectation are remembered better than totally familiar or totally novel detail.

FSSH is compatible with DPH, but assumes in addition a positive relationship between pre-postdiction discrepancy (postdictions subtracted from prediction ratings) and target recall. The logic underlying this prediction is that derivable details will be reconstructed at recall, but that readers' estimates of the derivability of ideas just encountered in text (postdictions) will sometimes be greater than actual derivability (predictions), resulting in superficial processing and consequent loss of detail. If FSSH holds, negative discrepancy scores indicating overestimation should be associated with low recall, leading to a positive Beta.

In contrast, CSSH predicts a negative relationship between pre-post discrepancy and target recall. Like FSSH, this view assumes that recall is supported by inferential reconstruction; but reading text containing unexpected information is thought to alter the state of schema by increasing

its power to derive text ideas consistent with the evolved but not the inital state, and decreasing its power to reconstruct ideas derivable from the initial but not the evolved state. Since prediction scores are estimates of target derivability from an initial state, while postdictions are derivability estimates from more evolved, intermediate states, positive discrepancy (indicating high predictions relative to postdictions) should be associated with poor memory, while negative discrepancy scores should be associated with higher recall. Thus a negative Beta would be observed.

In addition to the predictions enumerated above, each hypothesis was developed further to provide feasible explanations for trait-related dissimilarities in processing style, such as those observed in Study I. In summary, it was hypothesized that mechanisms producing a type 1 information decrement would tend to dominate the processing style of low ability learners, while those leading to a type 2 increment would characterize high verbal subjects. Consider, for example, the Change in State of Schema Hypothesis (CSSH). Only high ability processors may possess skills enabling them to learn new text material without "disaccommodating" inconsistent prior knowledge.

METHODS AND MATERIALS

The Memory Experiment

Text Passages. Passage 1 was a 1,150-word narrative describing fictional character Joe Smith. Initially the passage contained thirty blanks representing places in the story where the character might behave or think in a manner that could be characterized as either liberal, conservative, or neutral with respect to these two social stereotypes. After the passage containing blanks was written, a group of twelve adults worked together to generate four possible ideas or behaviors for each of the blanks in the passage--one liberal, one conservative and two neutral.

To complete the passage, the thirty blanks were randomly assigned by the investigator to either the conservative, liberal or neutral condition, so that ten of the passage blanks were filled in with liberal actions or ideas, ten with neutral, and ten with conservative. Within passages, the longest consecutive series of similar ideas was three in a row. To insure that the passage as a whole had neither a liberal nor a conservative bias, the full passage was read by a group of 8 male and 13 female students enrolled in a graduate measurement course, who rated the story on ten 10-point semantic differential scales, including one scale representing the liberal to conservative continuum. Results indicated that the passage deviated significantly from the neutral midpoint toward the conservative pole. The information in the passage blanks was then adjusted informally by the investigator and the rating procedure repeated with new raters until it was ascertained that the passage as a whole was neither liberally nor conservatively biased. The final passage rating on the ten-point liberal to conservative scale was 4.9.

An identical procedure was used to create a second story, entitled "Visit to a School," a 1,250-word passage describing the return visit of an unnamed narrator to the school he/she had attended as a child. Initially this story also contained thirty blanks into which actions characterized as either feminine, masculine, or androgynous were inserted. After random assignment of blanks to each of the three conditions and following informal adjustment made by the investigator, the final passage rating on a ten-point feminine to masculine semantic differential was 4.5.

Biasing Treatments. Two introductory biasing paragraphs and complementary titles were written for both passages. One experimental form of the Joe Smith story began with the title "Joe Smith: A Conservative." The introductory paragraph associated with this title described the lead character as a social and political conservative who held traditional views about marriage and religion, and who admired public figures like Anita Bryant, Ronald Reagan, and William F. Buckley. A second experimental form of the Joe Smith story was entitled "Joe Smith: A Liberal." The introductory biasing paragraph associated with this title described the lead character as a social and political liberal who held non-traditional views, enjoyed fleeting fads and fashions, and who admired public figures like Jane Fonda, Ralph Nader and George McGovern. The control version of the story contained no introductory biasing information and was entitled, simply, "Joe Smith."

One experimental form of the Visit to a School passage was entitled, "Visit to a School for Girls," and was introduced by a paragraph decribing the narrator's return to Mrs. Littlejohn's School for Young Ladies. A second experimental form of this story was entitled "Visit to a School for Boys." The introductory paragraph for this version described a return visit to Colonel Potter's School for Boys. The control form was entitled "Visit to a School," and contained no introductory biasing paragraph.

Posttest. A Cloze procedure was utilized for both immediate and delayed posttests. Subjects in all conditions recieved passages identical

in wording and order to their experimental texts except that no biasing paragraphs were included, and numbered blanks appeared instead of target ideas. In addition, subjects each received an answer sheet containing numbered blanks corresponding to those in the Cloze passages. Subjects were instructed to read the passage through once, and to " . . . try and recall the missing information as accurately as you can . . . try to write down exactly what the story said. If you can't remember the exact words the story used, try to convey the gist of what was said. If you are not sure of an answer, take a guess."

Scoring. Posttests were scored for accuracy in recall by two independent raters who were unaware of the treatment conditions. The following coding scheme was employed:

3 = Near perfect information recall--paraphrase capturing full meaning of keyed answer. Only small, insignificant details or redundant information lost. If generalization, importation, abbreviation, or specification evident, meaning of keyed answer not changed.

2 = Strong evidence of recall and answer similar in meaning to key answer, but some loss of information or change in meaning evident due to generalization, importation, abbreviation, or specification.

1 = Some evidence of recall present, but meaning of keyed answer is significantly altered due to generalization, abbreviation, importation, substitution, or specification.

0 = No evidence of recall apparent.

The average inter-rater reliability coefficient based on ten randomly drawn subjects was .90. After initial scoring and prior to analysis, between-rater discrepancies in coding were marked, discussed, and resolved.

Ability Test. The Extended Range Vocabulary Test from the ETS Kit of Factor-Referenced Cognitive Tests was administered to each subject. The ERVT is a 5-choice synonym test having items ranging from very easy to very difficult. The test has two parts, with each part consisting of 24 items and requiring 6 minutes to administer. It is suitable for grades 7-16.

Subjects were sixty undergraduate students enrolled in an introductory Educational Psychology course at Purdue Univerity in the Fall of 1980, who participated for course credit. Participation was voluntary. The sample, drawn from a course enrollment of approximately 300, contained 15 males and 45 females.

Procedures. Prior to the experiment, subjects were randomly assigned to treatment conditions as follows:

Control	Visit to School, Fem. Bias + Joe Smith, Conserv. Bias (n = 10)	Visit to School, Fem. Bias + Joe Smith Liberal Bias (n = 10)
(n = 20)	Visit to School, Masc. Bias + Joe Smith, Conser. Bias (n = 10)	Visit to School, Masc. Bias + Joe Smith, Liberal Bias (n = 10)

Consequently, there were three treatment conditions for each passage, a control group and two experimental groups. Because one biasing treatment pertained to sex-role stereotyping, treatment groups were equated on the basis of subject's sex by first randomly assigning all males, and then all females. Passage order was counterbalanced.

Subjects were run in two groups of thirty. Each subject attended two experimental sessions. At the first session, subjects were supplied experiemntal booklets corresponding to treatments previously assigned. Each booklet contained instructions, the two passages, and the Cloze versions of the passages employed in the posttest.

At the experimenter's signal, subjects opened their booklets to the instructions, also read aloud by the experimenter. Subjects were told that they would be asked to read a story, and that the objectives of the experiment were to understand the story as well as possible and be able to answer detailed questions. The experimenter then accepted questions, and gave the signal to begin reading. After all subjects had completed their first passage, the instructions were repeated and subjects were told to read their second story.

When all subjects had completed their readings and closed their booklets, posttest answer sheets were supplied. Subjects were instructed to open their booklets to the Cloze passage which corresponded to the first passage read. After completing the posttest on the first passage, subjects proceeded directly to the second posttest.

Participants returned one week later, at which time they completed posttests identical in form and procedure to those administered during the first session. Following the delayed posttest, the Extended Range Vocabulary Test was administered. Subjects were instructed not to discuss the experiment with classmates who might be participating in other phases of the study, were provided a debriefing sheet describing the memory phase of the experiment, and released.

Pre-Postdiction Norming Study

Text Passages. Two forms of the experimental texts were emloyed in this phase of the study, a prediction and a postdiction form. The prediction texts were identical to the reading passages employed in the memory experiment just described, except that the prediction forms contained consecutively numbered blanks which appeared in the passages in place of target ideas. Postdiction texts were also identical to the memory passages employed in Experiment 1, except that target ideas were underlined and consecutively numbered.

Biasing Treatments were identical to those employed in Experiment 1.

The Pre-Postdiction Rating Form contained a section for the Joe Smith passage, and another for the Visit to a School passage. Each section consisted of thirty items consecutively numbered to match the numbered blanks in the prediction form of the texts, or the numbered, underlined target ideas appearing in the postdiction form.

Each item on the rating form listed four choices of events or behaviors which might have appeared in the story at the point the target idea occurred, including the target event which actually did appear. Each item for the Joe Smith passage contained one liberal, one conservative, and two neutral choices. Those for "Visit to a School" consisted of one feminine, one masculine, and two neutral choices. These choices were obtained from the lists generated during development of the text passages.

Subjects who read the prediction form of the stories used the form to rate the four choices on their likelihood of occurrence, without knowing in advance which of the four choices actually occurred as the target idea. Those who read the postdiction form rated the four choices after having seen which of the events actually did occur. Numerical ratings were written in the blanks which appeared beside the four alternatives for each item. Ratings were obtained from an 11-point scale, which appeared on a board in the front of the room.

Ability Test. The Extended Range Vocabulary Test, as described in the previous section, was administered to each subject.

Subjects were 120 undergraduate students enrolled in an introductory Educational Psychology course at Purdue Univerity in the Fall of 1980, who participated for course credit. Participation was voluntary. The sample, drawn from a course enrollment of approximately 300, contained 33 males and 87 females. None of these subjects participated in other experiments associated with this study.

Procedures. Subjects were run in four groups of thirty subjects each. For each group, procedures were identical. As subjects arrived, they were told to take any seat in the room. After all were present, first the males, then females, were counted so that each participant was assigned either the number "one" or the number "two." "Ones" accompanied a trained

experimenter to the prediction session, and "twos" accompanied another trained experimenter to a room where the postdiction experiment took place. Each experimenter ran two prediction and two postdiction sessions. For both pre-and postdiction conditions, treatments and experimental design were identical to those described for the memory experiment. Passage order was counterbalanced.

Subjects were not assigned to conditions in advance. Rather, the appropriate number of booklets containing the pre- and postdiction forms of the texts had been prepared and counterbalanced in advance, and randomly distributed, face down, to desks in rooms where experiments were run. To insure that the proportion of males to females was equivalent in each condition, booklets intended for females were designated with an "F," while those intended for males were marked "M." Subjects were told to take any seat where a booklet was found matching a participant's sex.

Instructions for the prediction condition were read aloud while participants followed. Subjects were told to read through the first text and whenever they encountered a numbered blank, to look at the rating form for four choices of events which might have appeared in that blank. Without knowing which event actually occurred in the story, prediction Ss rated each possiblity as to its likelihood of occurrence in the story.

Postdiction subjects received a similar set of instructions. The primary difference between the pre- and postdiction conditions was that postdiction Ss estimated the predictability of ideas while knowing which event actually occurred, while prediction Ss estimated the predictability of the same ideas without knowing what actually happened in the story.

Subjects recorded their ratings for the story which appeared first in their booklets, and then proceeded directly to the story which appeared second. When all subjects had finished the rating task, participants took a 10-minute break while experimenters collected and checked the rating forms. Afterward, subjects returned for administration of the Extended Range Vocabulary Test and debriefing. During the debriefing, participants were instructed not to discuss the experiment with classmates who might be participating in other phases of the study. Both pre- and postdiction procedures required approximately one and one-half hours.

Structural Importance Norming Study

Text Passages were identical to those employed in the memory experiment.

Biasing Treatments were identical to those employed in both memory and pre-postdiction experiments.

Structural Importance Rating Form. As a first step in developing this form, the investigator worked with a volunteer assistant to divide the text passages into sub-units which could be rated as to their importance to the story as a whole. Rules for pause acceptability supplied by R.E. Johnson

(personal communication) served to guide the text break-down. A rating form was prepared for each experimental version of both stories. Each contained a story identical to one of the experimental texts except that on the rating form, the story was broken down into a columnar listing of the phrases which composed the text. To the left of each phrase was a blank. At the top of each page on the rating forms appeared a seven-point scale ranging from 1 (low importance) to 7 (high importance).

Subjects were 43 undergraduate students enrolled in an introductory Educational Psychology course at Purdue University in the Fall of 1980, who participated for course credit. Participation was voluntary. The sample included 9 males and 34 females who had not participated in other experiments related to this study.

Procedures. The design was identical to that employed in the previous experiments. A list of volunteers was obtained in advance and subjects were assigned to conditions prior to being run. An envelope containing the appropriate text set-up, corresponding structural importance rating forms and a set of instructions, was prepared for each subject. Subject names were written on the envelopes, and these were passed out in class.

The ratings were completed by the subjects at home. They were told to read the first story, and then to close their booklets and record ratings of structural importance for each text idea listed on the rating form, utilizing the seven-point scale. After rating one passage, the second story was read and then rated in identical fashion.

ANALYSIS AND RESULTS

The method of analysis was stepwise multiple regression, with target text idea as the unit of study. A regression matrix was constructed to serve as the basis for several statistical procedures. The design for this matrix is furnished as Figure 1.

Insert Figure 1 about here

The dependent variable, obtained from the memory experiment, was mean recall score for target ideas contained in two passages. Scores were computed by averaging over subjects within each treatment condition. Since

each target was measured under three experimental conditions (two biasing treatments and a control condition) at two points in time (immediate and delayed posttest), the dependent variable vector was composed of six repeated measures on each target.

Recall was regressed on five different types of predictors. Referring to Figure 1, vector 1 contained the within-treatment structural importance ratings for each target, obtained from the data of Experiment 3 by averaging over subjects within groups. Vectors 2 through 5 contained the following variables from Experiment 2 (Pre-postdiction Experiment): Prediction ratings for each target idea; prediction rating quadratic terms; prediction-postdiction discrepancy scores for each target; and postdiction ratings. As with recall scores, scores based on the pre-postdiction experiment were computed by averaging over subjects within treatment conditions. Each continuous variable represented in vectors 1-5 was associated with one or more hypotheses concerning the relationship between accuracy of recall and predictability of target ideas at the time of encoding.

Vectors 6 through 17 were twelve orthogonal contrasts representing apriori hypotheses related to main and interactive treatment effects on memory. These contrasts were based on a 3 x 2 x 3 experimental design consisting of two within-item treatments (A and B), and one between item treatment (C). The three levels of A were repeated measures on each target item under a biasing condition based on a social stereotype (A_1), a second biasing condition based on a contrasting social stereotype (A_2), and a control condition (A_3). Immediate and delayed posttests were the two levels of B. The three levels of C represented types of target ideas, where C_1 items confirmed the A_1 social stereotype but not A_2; C_2 items

confirmed A_2 but not A_1; and C_3, or neutral items, neither confirmed nor disconfirmed either stereotype. As a group, these hypotheses served three purposes. Those related to biasing treatments provided a basis for comparing results with a previous study (Derry, Note 1), and also for confirming the expected relationship between attitude biasing and predictability. Those for which no theoretical predictions were advanced served to control for the possibility of nuisance variance which might contaminate the error term.

Vectors 18 through 26 represented nine treatment x continuous variable interaction terms associated with hypotheses of interest to the investigator.

Vectors 27 through 79 were dummy codes for repeated measures taken on each target idea under three experimental conditions (2 treatments and a control condition) at two points in time (delayed vs. immediate posttest).

Procedure 1: Regression of Target Recall Scores on Continuous Predictors Entered Before Treatment Codes

The dependent variable was mean recall score for 54 [1] target ideas contained in two text passages, with repeated measures taken on each target at two points in time under three experimental conditions. Recall scores were regressed on two sets of predictor variables in the stepwise procedure outlined below.

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[1] The original vector of dependent variables contained six repeated measures on 60 target ideas. One target, a masculine item in the Visit to a School passage, occurred at the end of a text page and was split between pages. This was the only item which produced an outlying mean recall score of "zero," and it was eliminated from the analysis. To maintain a balanced design, one target idea was chosen at random from each of the other subscales, and eliminated, resulting in a dependent variable vector containing six repeated measures on 54 target ideas.

Continuous variables were entered first, and then orthogonal contrasts, in the following order:

Step 1. Structural importance ratings (covariate)

Step 2. Structural importance ratings + prediction ratings

Step 3. Structural importance ratings + prediction ratings + prediction quadratic terms.

Step 4. Structural importance ratings + prediction ratings + prediction quadratic terms + pre-postdiction discrepancy scores

Steps 5-16. To determine whether treatments explained significant additional variance, and also to control for nuisance variance, all twelve orthogonal contrasts were entered next. Since orthogonal vectors are uncorrelated, order of entry was not controlled.

The rationale for order of entry of continuous variables was as follows: Structural importance, a known correlate of memory, was entered first to control for the possibility that target ideas had occurred at different levels in the passages' structural hierarchy. Prediction ratings and quadratic terms entered second and third, removed recall variance due to initial differences in target predictability. Discrepancy scores, entered fourth, provided a direct test of the hypotheses that pre-postdiction differences would account for memory variance over and above that due to target item differences in structural importance and initial predictability.

As a final step, vectors representing codes for repeated measures were added to the final equation. These codes were entered last to avoid removal, prior to hypothesis testing, of systematic between-item variance correlated with continuous predictors. Repeated measures were also employed to address the question of how much variance was systematic between-item difference unaccounted for by predictors in the model.

Results of Procedure 1

Overall F-tests. For the analysis in which the dependent variable vectors were combined for the two passages, the multiple R resulting from regression of target recall on the set of four continuous predictors was .24 ($F_{4,319} = 4.8$, $p < .001$). For the passages analyzed separately, R's were .25 ($F_{4,157} = 2.6$, $p < .038$) for the Joe Smith passage, and .20 ($F_{4,157} = 1.65$, $p < .165$) for Visit to a School.

Addition to the regression equation of the twelve orthogonally coded vectors representing treatment effects increased the multiple R to .37 ($F_{16,307} = 3.10$ $p < .001$) in the combined analysis, and to .49 ($F_{16,145} = 2.85$, $p < .001$) for the Joe Smith passage, and .30 ($F_{16,145} = .87$, $p < .606$) for "Visit to a School.' Tests of R-increments were performed, revealing significant additional overall treatment effects over and above those explained by the continuous predictor set, for both the combined analysis ($F_{12,307} = 2.41$, $p < .01$) and the Joe Smith passage ($F_{12,145} = 2.84$, $p < .01$), but 'ot for "Visit to a School" ($F_{12,145} = .63$, $p < .40$).

Coded vectors representing repeated measures were added to the regression equation in a final step, increasing the multiple R for the combined analysis to .96 ($F_{69,254} = 41.50$, $p < .001$), and to .95 ($F_{42,119} = 24.49$, $p < .001$) for the Joe Smith passage, and .97 ($F_{42,119} = 49.64$, $p < .001$) for "Visit to a School." For all analyses, then, over 60% of the variance in the dependent variable vector was due to systematic between-item variance unexplained by other predictors in the regression equation.

Hypothesis Testing. Table 1 summarizes results of the stepwise regression for the passages combined. The test statistic for each hypothesis was based on the increment in sums of squares removed by the equation

which entered the prediction vector associated with that hypothesis. Two F-tests were made for each hypothesis. For F_1, the error term was mean square residual based on sums of squares remaining after removal of variance due to the 16-predictor regression equation, but prior to removal of item variance accounted for by repeated measures codes. The F_1 test treated systematic between-item variance unaccounted for by the 16-predictor equation as legitimate error variance for the model. Because apriori hypotheses were advanced, for each test the F-table was entered with 1 degree of freedom for the numerator, and k-16-1 degrees of freedom for the denominator, where k represents the total number of mean recall scores in the dependent variable vector.

The error term for the F_2 tests was based on the residual variance remaining after removal of all systematic between-item variance unexplained by the 16-predictor equation. For these tests, the F-table was entered with 1, k-p-1 degrees of freedom, with p representing the total number of target items minus 1.

Results of the F_1 tests show that only one continuous variable, pre-postdiction discrepancy score, was a statistically significant predictor of mean recall for target ideas. Discrepancy accounted for a significant proportion of the recall variance in both Joe Smith ($F_{1,145} = 11.77$, $p < .01$) and Visit to a School ($F_{1,145} = 4.77$, $p < .05$) passages, and in the analysis of the two passages combined ($F_{1,307} = 19.46$, $p < .01$). The sign of the Beta in all three analyses was negative, providing support for the Change in State of Schema Hypothesis (CSSH), but not for the False Sense of Security Hypothesis (FSSH). Results did not support the Structural Importance Hypothesis (SIH), or either version of the Discrepancy Principle Hypothesis (DPH).

Insert Table 1 About Here

Table 2 shows the mean recall for those target items in the dependent variable vector which produced pre-postdiction discrepancy scores falling ± 1 SD (7.96) above or below the discrepancy mean (.106). A total of 28 dependent variables representing 25 different items, were associated with positive discrepancy scores one standard deviation or more above the discrepancy score mean, indicating that prediction scores were higher than postdictions. The average discrepancy score for this group of items was +12.80. A total of 29 dependent variables, representing 27 different target items, were associated with negative discrepancy scores one standard deviation or more below the mean, indicating that postdictions were higher than predictions. The average discrepancy score for this group was -12.34. T-tests (2-tailed) were performed on differences in mean recall between the high and low discrepancy groups. For the analysis in which two texts were combined, significant mean differences were found for both immediate (t_{55} = -3.17, $p < .01$) and delayed (t_{55} = -2.57, $p < .02$) recall intervals. Similar findings are displayed for the Joe Smith passage, analyzed separately. The Visit to a School passage produced mean differences which approached significance ($p < .20$). There were no passage effects. All mean differences occurred in the hypothesized direction for the Change in State of Schema Hypothesis.

Insert Table 2 About Here

F_1 tests also revealed three orthogonally coded vectors, #'s 8, 9, and 10, that were significant predictors of recall in the Joe Smith passage. Two of these (9 and 10) were statistically significant for the combined analysis. Of these tests, none were associated with theoretically derived hypotheses concerning recall, but were entered into the equation as controls for nuisance variance due to item sampling error and time-dependent forgetting.

F_2 tests were much more powerful than F_1 tests, and were conducted to determine whether removal of systematic between-item variance would reveal additional effects, possibly changing interpretations from the F_1 analysis. But though some additional small effects were detected by the F_2 analysis, pre-postdiction discrepancy was again the only theoretically supported predictor that was consistently significant for both Joe Smith ($F_{1,119} = 73.00$, $p < .001$) and Visit to a School ($F_{1,119} = 74.67$, $p < .001$) passages, and for the combined analysis ($F_{1,254} = 166.93$, $p < .001$).

Procedure 2: Regression of Target Recall on Treatment Codes Entered Before Continuous Predictors

This analysis was similar to procedure 1, except that orthogonally coded vectors representing treatment effects and interactions entered the regression equation first, and the continuous predictor set was entered second. This procedure served two purposes. First, by leading with the orthogonal vectors, it was possible to determine whether continuous predictors, particularly pre-postdiction discrepancy scores, explained a significant proportion of variance over and above that produced by treatment effects. Second, because orthogonal codes were entered prior to continuous

predictors, it was possible to detect treatment effects which might have been masked in procedure 1, due to intercorrelations among continuous variables and treatment codes.

However, reversing the order of entry for treatment codes and continuous predictors did not alter the findings or interpretations derived from procedure 1.

Procedure 3: Treatment x Continuous Predictor Interactions

This analysis was also similar to procedure 1, except that following the entry of continuous predictors and treatment codes into the regression equation, and prior to entry of repeated measures codes, recall was regressed on nine coded vectors representing treatment x continuous variable interactions of interest to the investigator. The purpose of this analysis was to ascertain that continuous variables performed equally as predictors of recall in both treatment and control conditions, and at immediate and delayed recall intervals. Interactions associated with F_2 terms exceeding the .05 level of significance were allowed to enter the equation.

Two significant interactions were detected. Prediction ratings were more accurate determinants of recall at the time of delayed testing in both "Visit to a School" ($F_{1,117} = 5.76$, $p < .025$), and in the combined analysis ($F_{1,252} = 5.73$, $p < .017$), with no passage effects being detected. This finding indicates that during the recall interval, some Ss may return to a former state of schema. Other studies (e.g., Spiro, 1975, 1977) have demonstrated what amounts to increased "solidification," over time, of the evolved memory representation.

In the Visit to a School passage only, pre-postdiction discrepancy interacted with the treatment vs. control contrast ($F_{1,117} = 5.16$, $p < .025$).

The sign of the Beta was negative, reflecting that discrepancy scores were in fact better predictors in the control condition than in the treatments. The validity of the Change in State of Schema hypothesis evidently is not dependent on a highly biased state of mind.

Procedure 4: Multiple Regression with Postdiction Ratings

The significant finding of procedure 1 was a small, but strikingly consistent, negative relationship between target idea recall and pre-postdiction discrepancy, indicating that ideas reduced in their predictability during reading tend to be forgotten, while those increased in predictability are remembered. In other words, change in predictability which took place during processing was a significant factor in recall, though predictions per se and structural importance ratings were not.

One purpose of the present procedure was to determine whether within-item change in predictability was a more significant factor in recall than between-item variance in postdiction ratings, predictions derived from an evolved state of schema. Since discrepancy scores were a linear composite of both pre- and postdiction ratings, it was necessary to eliminate the possibility that postdictions alone might explain procedure 1 findings. If postdictions are the primary variance source, then the discrepancy construct is unnecessary since it could be argued that subjects simply remember ideas that are reconstructable from the state of schema as it exists after reading. However, if discrepancy is a necessary condition for remembering, then recall may depend upon a reading process whereby ideas undergo change in their predictability. Both findings would be compatible with CSSH, but would reflect different versions of that hypothesis.

To investigate this question, procedure 1 was again conducted using postdiction ratings in the regression equation in place of predictions. In the Joe Smith passage, neither postdictions nor postdiction quadratic terms were significant as sources of recall variance, though pre-postdiction discrepancy scores did significantly contribute to variance explained ($F_{1,145} = 10.15$, $p < .01$). Postdiction was a significant predictor for Visit to a School items ($F_{1,145} = 3.98$, $p < .01$), but pre-postdiction discrepancy did not reach significance ($F_{1,145} = 2.43$, $p < .25$). In the combined analysis, both postdiction (entered as the second continuous variable) and pre-postdiction (entered fourth) accounted for significant proportions of variance. F_1 for postdiction was 7.06 ($p < .01$), and for pre-post discrepancy was 13.10 ($p < .01$). There were no passage effects. These results support the argument that both postdiction and pre-postdiction discrepancy represent constructs useful in explaining item variance in recall. The two predictors entered together produced a multiple R of .24 ($p < .001$) in the combined analysis. Thus recall appears to reflect both the process, as well as the product, of adaptive learning.

Another way to confirm the schema-change process as a determinant of recall is to examine the relative and joint contributions of both pre- and postdiction variables in a multiple regression equation including both as predictors of memory for target ideas. If change in predictability during reading is the important variable, then the best equation for both predictors considered jointly should produce a significant multiple R, with one Beta having a positive, and the other a negative sign. Opposite signs would indicate that the <u>difference</u> between prediction and postdiction ratings is an important factor, and that the best composite predictor is a discrepancy score.

Insert Table 3 About Here

Standardized and unstandardized equations for the regression of recall on both prediction and postdiction ratings are displayed in Table 3. When entered as the sole independent variable, prediction did not explain a significant proportion of recall variance in either passage considered individually, or in the combined passage analysis. However, F-tests of the increment in R^2 produced by entering prediction ratings following postdictions indicated that the proportion of residual variance explained was statistically significant in both Joe Smith ($F_{1,159} = 8.98$, $p < .01$) and combined analyses ($F_{1,321} = 12.57$, $p < .01$), though not for "Visit to a School" ($F_{1,159} = 2.43$, $p > .05$). Postdictions entered as the sole predictor did produce a significant R^2 for the school passage ($F_{1,160} = 4.19$, $p < .05$), and for the combined analysis ($F_{1,322} = 6.42$, $p < .05$), though not for "Joe Smith" ($F_{1,160} = 1.49$, n.s.). F-tests of increment in R^2 revealed that when postdiction ratings were entered following predictions, the increase in variance explained was statistically significant for both Joe Smith ($F_{1,159} = 10.45$, $p < .01$) and Visit to a School ($F_{1,159} = 5.22$, $p < .05$) passages, and for the combined analysis ($F_{1,321} = 18.69$, $p < .01$).

Prediction and postdiction ratings considered jointly did explain a significant proportion of the recall variance in both passages. The multiple R for the combined analysis was .240 ($F_{2,320} = 9.61$, $p < .01$). Multiple R's for Joe Smith and Visit to a School passages were .25 ($F_{2,158} = 5.27$, $p < .01$) and .20 ($F_{2,158} = 3.33$, $p < .05$), respectively. As shown in Table 3, the signs of the Betas were negative for predictions,

and positive for postdictions, adding strength to the argument that change in predictability during reading was an important factor in recall.

Aptitude x Treatment Interaction Analysis with Pre-post Discrepancy Scores

It was also hypothesized that high and low ability subjects would differ in their tendencies to alter predictability as a function of reading. Specifically, low ability readers were expected to show a greater tendency to decrease their ratings of bias-confirming target units, reflecting tendencies to disaccommodate bias-confirming ideas. This hypothesis was based on the observation from a previous study (Derry, Note 1) that low ability subjects lost familiar detail as a result of an advance organizer treatment which presumably highlighted novel and discrepant ideas. In addition, it was predicted that high ability subjects would show a tendency to increase their prediction ratings of bias-disconfirming details, this prediction being based on the previous observation that high ability subjects improved their recall of novel ideas as a result of schema clarification.

The dependent variable vector for this analysis was composed of four pre-postdiction discrepancy scores computed for each of 36 target ideas contained in two passages. Items representing feminine, masculine, liberal, and conservative ideas were analyzed, with neutral items being eliminated. The four scores for each target represented treatment combinations based on a 2 x 2 repeated measures design. The two levels of the first factor were repeated measures for each target taken under confirming and disconfirming biasing conditions. The two levels of the second factor represented repeated measures on each target item taken for high and low

ability subjects. Subjects scoring .5 SD above or below the ERVT mean were included, resulting in the use of 10 low and 18 high ability subjects. Discrepancy scores were obtained by subtracting the within-group postdiction mean from the within-group prediction mean for each target idea.

Pre-postdiction discrepancy scores were regressed on vectors representing aptitude, treatment condition, and aptitude x treatment interaction. Entered first, verbal aptitude was not a significant predictor of pre-post discrepancy ($R = .10$, $F_{1,140} = 1.50$, $p < .25$). Entered second, biasing treatment effects increased the multiple R to .20 and accounted for a significant proportion of the residual variance ($F_{1,140} = 4.53$, $p < .05$). The sign of the beta was positive, indicating that bias-confirming items are reduced in their predictability, while bias-disconfirming items are increased in their predictability as a result of reading. A significant aptitude x treatment interaction was also obtained ($R_{A,T,ATI} = .34$, $F_{1,140} = 12.25$, $p < .001$). Mean discrepancy scores reflecting this interaction are shown in Table 4. Biasing effects were significant for low ($t_{35} = 2.82$, $p < .01$), but not for high ability subjects ($|t| < 1$). These results demonstrate that processing schemata of low ability subjects are more susceptible to change during reading than those of high ability subjects.

Insert Table 4 About Here

Analysis of Relationship Between Change in Item Predictability as a Function of Reading, and Item Recall, for High and Low Ability Groups

Target ideas which undergo a reduction in predictability during reading are associated with lower recall scores than ideas for which pre-

diction ratings are increased. Judging from previous findings (Derry, Note 1), it seemed logical to hypothesize that this change-in-state-of-schema effect would predominate for low rather than high ability learners.

Subjects scoring .5 SD above or below the ERVT mean for all experimental subjects were included in the high and low ability groups, respectively. Items associated with pre-postdiction discrepancy scores falling .5 SD from the discrepancy score mean of all bias-confirming and bias-disconfirming items for the two groups combined, were analyzed.

Four t-tests were run, based on apriori predictions that differences in mean recall between high and low discrepancy items would occur only for the low ability group. Results are shown in Table 5. These data, combined with results of the immediately preceding anlaysis, indicate that the Change in State of Schema hypothesis describes features of the learning style exhibited by low ability, but not high ability, learners. The data of Table 5 also indicate that the most obvious effect of the "perspective shift" is loss of detail consistent with the original state of schema.

Insert Table 5 About Here

Discussion

Pre-postdiction discrepancy was the only theoretically derived predictor which accounted for a significant proportion of the item recall variance for both passages when analyzed separately, and for the combined analysis. As a determinant of recall, it was superior to both pre- and postdiction ratings considered individually, and to the equations which

included pre- and postdiction quadratic terms. Neither structural importance ratings nor biasing treatment codes accounted for a significant proportion of the variance. The Structural Importance Hypothesis, which has been confirmed often in previous research, was not confirmed in this study for two possible reasons. First, the passages were episodic, diary-like narratives with little additional structure. Also, target items were all of approximately equal structural importance, as indicated by low standard deviations for these ratings.

The sign of the beta weight reflecting the relationship between pre-postdiction discrepancy and target recall was negative, providing support for the Change in State of Schema Hypothesis, but not the False Sense of Security Hypothesis. The Discrepancy Principle was not supported. No support was provided for special versions of FSSH or DPH. Furthermore, the treatment effects observed in Study I were only partially replicated ("Visit to a School"), and even this effect was only marginally reliable.

The absence of treatment effects continued a frustrating history of research employing the biasing paradigm, which as a whole has produced inconsistent results. That the reader's initial cognitive bias can and often does influence discourse comprehension is clear, but the mechanisms which account for this influence are not fully understood. This lack of understanding is particularly evident in the chronicles of advance organizer research (Barnes & Clawson, 1975; Cronbach & Snow, 1977, p. 352; Luiten, Ames & Ackerson, 1980), which concludes that for all its potential, cognitive biasing is not yet harnessed as a dependable pedagogical tool.

A comparison of Studies I and II pointed to several methodological differences which could explain the absence in the second study of biasing

effects observed in the advance organizer experiment. First, a multiple choice posttest requiring fine discrminations was employed in Study I, and possibly was more sensitive to subtle changes in recall accuracy than was the Study II scoring procedure depending on raters' judgements. Also in the first experiment, instructions to subjects which explicitly pointed out similarities and differences between the text and prior knowledge, and which told subjects to actively employ the schema as a basis for text processing, probably enhanced the effects of schema use. These instructions were not provided in the second experiment, and thus the difference in treatments between the two studies paralleled the distinction drawn by Ausubel (1968) between comparative and expository organizers. Perhaps the comparative strategy forces more subjects into a knowledge-updating mode. Future research could explore the processing mode hypothesis by varying instructions on how the schema should be utilized during reading.

A third possible explanation for the unsuccessful use of biasing in Study II pertains to the ratio of familiar to unfamiliar information present in the experimental texts. The Greek mythology stories contained a small number of ideas that were redundant to the schema, and a relatively large amount of novel and discrepant information. The two stories employed in the present study contained approximately equal proportions of redundant and discrepant information. Perhaps permanent learning of discrepant detail occurs most readily when the ratio of discrepancy to redundancy exceeds a certain threshold, causing a shift in perspective. Discrepant information in below threshold amounts may lead to proactive subordination of the text, such as that predicted by the Assimilation Hypothesis, while amounts above threshold may subordinate prior knowledge to the new text

ideas, producing the patterns observed in Study I. Approximately equal amounts of redundant to discrepant detail could counteract one another during processing, obscuring the effects of a biasing treatment. Future research which varies the ratio of redundant to nonredundant information might shed further light on the laws governing effects of schema utilization.

Though biasing treatment effects were not totally replicated in the second study, the finding of a consistent, negative relationship between recall accuracy and pre-postdiction discrepancy directed attention toward an important schema-based processing mechanism which could explain the type 1 deficit observed in Study I. Close inspection of the data confirmed that information increased in predictability during reading was remembered better than data which was decreased in its derivability. Furthermore, this effect could not be explained in terms of a simple predictability rule, i.e., the maxim that the familiar and expected will be recalled with greater accuracy than the unfamiliar, unpredictable event. As a determinant of item recall, the difference between pre- and postdictions was superior to either predictions or postdictions entered alone, indicating that the change process itself was an influential factor. Though other factors may overshadow accommodative change as a predictor of immediate recall, it does seem apparent that for some learners, text processing involves an obscuring of familiarity.

Perhaps the act of accommodation requires that additional processing time and resources be devoted to non-conforming data, with greatest resources being devoted to ideas which are difficult to incorporate. In other words, information which exerts change forces on the reader's cognitive attitude is thought to be increased slightly in its memorability because

the change process itself requires devotion of extra encoding time. Information reduced in its predictability during reading was recalled with less accuracy. This finding suggests that when the schema conforms to new ideas, some details are "disaccommodated" during the change. The paradoxical implication of this theory is that knowledge-updating may require a simultaneous forgetting of something that is known. Perhaps it was this phenomenon which prompted Shaw to observe: "You have learnt something. That always feels at first as if you had lost something" (Shaw, 1964, as cited in Iser, 1978).

The Change in State of Schema Hypothesis as validated in the present study provided a good fit for the low ability learning pattern observed in Study I, but a less satisfactory fit for high ability data. Accordingly, it was hypothesized that gain and loss due to accommodative change in the higher order discourse schema was a trait-related occurrence reflecting differences in learning styles exhibited by high versus low ability learners. This hypothesis was confirmed through further analysis of Study II data, which indicated that low ability subjects are significantly more inclined than high ability Ss to alter their predictions during reading. The perspectives of low ability readers were in fact more easily swayed by the introduction during reading of new information. Also for low ability Ss, the perspective shift was more clearly associated with loss of knowledge consistent with the original bias.

Perhaps subjects with good logical skills are more capable of creating subconscious, rationalizing linkages between prior knowledge and new, unexpected details, permitting even contradictory components of text to

reside as integral parts of a single, holistic discourse representation. This would account for their capacity to encode new information while maintaining a stable attitutde and memory for the past. Low ability subjects might be less adept with this process, and rather than building consistencies between old and new, they adopt a strategy of eliminating those elements of the original cognitive bias which seem inconsistent with a new body of data.

Limitations on the span of working memory, perhaps biologically determined, may bottleneck the adaptive learning process, aggravating tendencies for some subjects to drop or obliterate currently familiar information to accomodate new learning. Conversely, the development of logical skills which enhance ability to discover previous learning embedded in text would compensate for limitations in capacity to memorize. A trend in the data of Study I indicated that subjects with the combined traits of poor memory and good logical skills might have increased knowledge-updating with schema utilization.

In addition, low ability subjects are likely to approach text with only a high-level, intuitive understanding of the subject-matter, whereas mature readers are apt to invole formalized structures which subsume many hierarchically arranged anchoring terms. The presence of a substructure may serve to buffer the reader's high-order conceptual understanding against change forces exerted during processing by the new text ideas. The absence of a formal substructure would require direct assimilation to high-level concepts, leading to rapid alteration of the reader's schema, causing loss of some of its original capacity. An added implication of this view is that the process of recall for low ability subjects would eventually depend upon such activities as fabrication, prediction, and vague inference,

whereas the high ability reader would proceed throug a structured network of operations characterized by deductive reasoning and systematic tracing, leading to high precision in recall. A subsequent analysis in fact did show that recall for low ability learners involves more prediction that recall for high ability learners.

Though the shifting perspective was associated with learners of low verbal and reasoning ability, this system of labeling may be simplistic and inappropriate. Perhaps "low ability" learners are field dependent and less "cognitively differentiated" in the sense suggested by Witkin. Or maybe they have been deprived of some genetic intellectual inheritance or have failed to develop certain formal, logical operations. Or perhaps due to other factors such as socialization and experience, these learners have replaced the often aversive and tedious practice of acquiring data with a well developed system of aesthetic response (Iser, 1978).

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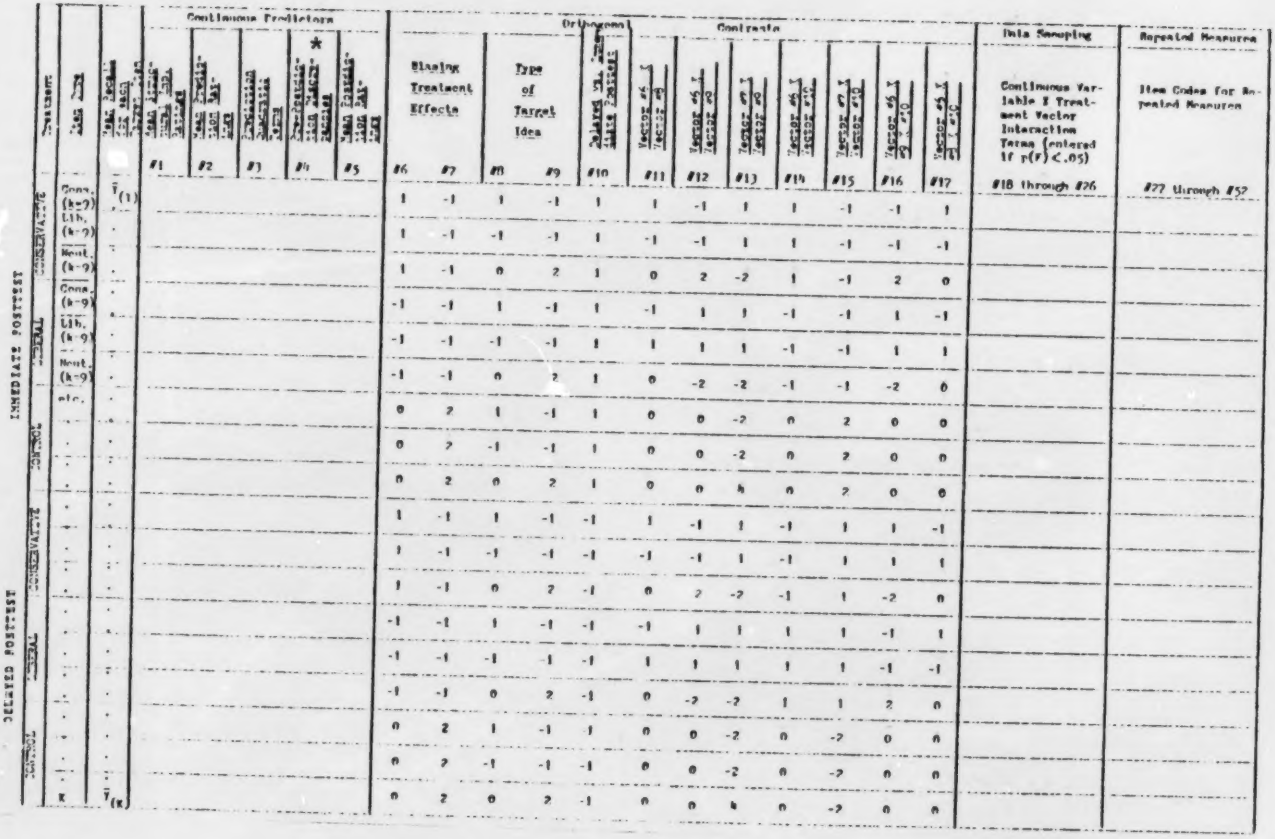
Figure 1. Design Matrix for Regression Analysis



			Continuous Predictors					Orthogonal Contrasts								Data Sampling	Repeated Measures
								Blocking Treatment Effects		Type of Target Idea		Delayed vs. Immediate Contrast	Vector #5 x Vector #6	Vector #5 x Vector #7	Vector #5 x Vector #8	Vector #5 x Vector #9	Vector #6 x Vector #7	Vector #6 x Vector #8	Vector #6 x Vector #9	Vector #7 x Vector #8	Vector #7 x Vector #9	Vector #8 x Vector #9	Continuous Variable X Treatment Vector Interaction Terms (entered if $p(F)<.05$)	Item Codes for Repeated Measures
			#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18 through #26	#27 through #52
DELAYED POSTTEST	CONSERVATIVE	Cons. (k=2)	$\bar{Y}_{(1)}$					1	-1	1	-1	1	1	-1	1	1	-1	-1	1		
		Lib. (k=2)						1	-1	-1	-1	1	-1	-1	1	1	-1	-1	-1		
		Neut. (k=9)						1	-1	0	2	1	0	2	-2	1	-1	2	0		
	LIBERAL	Cons. (k=9)						-1	-1	1	-1	1	-1	1	1	-1	-1	1	-1		
		Lib. (k=9)						-1	-1	-1	-1	1	1	1	1	-1	-1	1	1		
		Neut. (k=9)						-1	-1	0	2	1	0	-2	-2	-1	-1	-2	0		
		etc.						0	2	1	-1	1	0	0	-2	0	2	0	0		
								0	2	-1	-1	1	0	0	-2	0	2	0	0		
								0	2	0	2	1	0	0	4	0	2	0	0		
IMMEDIATE POSTTEST	CONSERVATIVE							1	-1	1	-1	-1	1	-1	1	-1	1	1	-1		
								1	-1	-1	-1	-1	-1	-1	1	-1	1	1	1		
								1	-1	0	2	-1	0	2	-2	-1	1	-2	0		
	LIBERAL							-1	-1	1	-1	-1	-1	1	1	1	1	-1	1		
								-1	-1	-1	-1	-1	1	1	1	1	1	-1	-1		
								-1	-1	0	2	-1	0	-2	-2	1	1	2	0		
								0	2	1	-1	1	0	0	-2	0	-2	0	0		
								0	2	-1	-1	-1	0	0	-2	0	-2	0	0		
		N	$\bar{Y}_{(N)}$					0	2	0	2	-1	0	0	4	0	-2	0	0		

Table 1. ANOVA of Mean Recall for 54 Target Ideas Contained In Two Passages, Measured Under Three Treatment Conditions at Two Points in Time. Analysis Based on Stepwise Regression of Recall Scores on 4 Continuous Predictors and 12 Orthogonal Contrasts Representing Treatment Effects and Interactions.

Source	Increase In SS	DF	MS	F1	F2
Vector Description					
1. Structural Imp.	0.084	1	0.084	0.22	1.87
2. Prediction Ratings	0.225	1	0.225	0.58	*5.00
3. Prediction^2	0.028	1	0.028	0.07	0.62
4. Pre-Postdiction Discrepancy	7.52	1	7.512	**19.46	**166.93
6. A_1 vs. A_2	0.323	1	0.323	0.84	**7.18
7. $(A_1 + A_2)/2$ vs. A_3	0.402	1	0.402	1.04	**8.93
8. C_1 vs. C_2	1.461	1	1.461	3.78	**32.47
9. $(C_1 + C_2)/2$ vs. C_3	4.935	1	4.935	**12.78	**109.67
10. B_1 vs. B_2	3.820	1	3.820	**9.90	**84.88
11. Vec 6 X Vec 8	0.166	1	0.166	0.30	2.58
12. Vec 6 X Vec 9	0.000	1	0.000	0.00	0.00
13. Vec 7 X Vec 9	0.034	1	0.034	0.09	0.75
14. Vec 6 X Vec 10	0.034	1	0.034	0.09	0.75
15. Vec 7 X Vec 10	0.022	1	0.022	0.06	0.49
16. Vec 6 X 9 X 10	0.092	1	0.092	0.24	2.04
17. Vec 6 X 8 X 9	0.088	1	0.088	0.23	1.96
Total Regression	19.177	16	1.199	**3.11	**26.64
Residual 1	118.529	307	0.386		
Residual 2 (Item variance removed)	11.412	254	0.045		

*$p < .05$ **$p < .01$

Table 2. Mean Recall and Standard Deviations (in parentheses) for Target Ideas Producing Pre-Postdiction Discrepancy Scores Falling ±1 SD (7.96) above (PRE > POST) or Below (PRE < POST) Discrepancy Score Mean (.106). Recall Scores Ranged from a Low of .100 to a High of 3.00

	PRE > POST	PRE < POST	MEAN DIFF.	t	p
Joe Smith Text:	(k=9)	(k=18)			
Time 1	1.68 (.47)	2.25 (.60)	-.57	-2.70	<.020
Time 2	1.53 (.49)	1.91 (.56)	-.38	-1.84	<.100
Time 1+2	3.21 (.95)	4.16 (1.13)	-.95	-2.32	<.05
School Text:	(k=19)	(k=11)			
Time 1	1.55 (.72)	1.89 (.62)	-.34	-1.39	<.200
Time 2	1.32 (.69)	1.66 (.72)	-.34	-1.32	<.200
Times 1+2	2.87 (1.39)	3.55 (1.25)	-.68	-1.40	<.200
Texts 1+2:	(k=28)	(k=29)			
Time 1	1.59 (.64)	2.11 (.62)	-.52	-3.17	<.010
Time 2	1.39 (.63)	1.81 (.63)	-.42	-2.57	<.020
Times 1+2	2.98 (1.26)	3.93 (1.19)	-.95	-2.97	<.010

Table 3. Standardized (in parentheses) and Unstandardized Beta Weights Obtained from Regression of Target Recall on Prediction and Postdiction Ratings. Recall was Scored on a Scale Ranging from 0 to 3.0. Pre- and Postdictions Ranged from a Possible Low of 0 to a Possible High of 100.

	Constant	Pre	Post	R	F
JS	1.60	-.019 (-.50)	+.023 (+.53)	.25	**5.27
VTS	1.31	-.010 (-.28)	+.016 (+.42)	.20	*3.33
JTS + VTS	1.43	-.016 (-.43)	+.021 (+.52)	.24	**9.61

* $p < .05$ **$p < .01$

Table 4. Mean Pre-Postdiction Discrepancy and Standard Deviations (in parentheses) for Bias-Confirming and Bias- Disconfirming Target Text Ideas Computed for High and Low Verbal Ability Groups.

	Bias Confirming (k=36)	Bias Disconfirming (k=36)
Low Verbal	+7.14 (13.34)	-4.87 (13.38)
High Verbal	+2.10 (13.56)	-.02 (12.47)

Table 5. Means and t-tests Illustrating the Relationship Between Change in Item Predictability During Reading, and Item Recall, for High and Low Ability Subjects.

	PRE > POST	PRE < POST	MEAN DIFF.	t	p
Low Ability:	(k=24)	(k=19)			
Time 1	1.57 (.63)	2.02 (.79)	.45	2.26	<.025
Time 2	1.30 (.58)	1.69 (.86)	.39	1.87	<.05
High Ability:	(k=19)	(k=26)			
Time 1:	2.24 (.57)	2.25 (.63)	.01	.05	>.50
Time 2:	2.05 (.68)	2.13 (.64)	.08	.39	>.50